

Report: Using the Empathy Assessment Index (AEI) to measure long-term Empathy changes as a result of BASIC AVP Workshop participation: Part 1

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Summary

This report summarizes the results and conclusions to date from Part 1. of a pilot project to study changes in individual empathy as a result of participation in a BASIC level AVP workshop. The tool used is the AEI questionnaire, administered confidentially to inmates in Delta yard, a Level IV Protective Custody (SNY) yard at the Substance Abuse Treatment Facility (SATF) prison in Corcoran CA. Results for an AVP BASIC workshop from a group of fifteen participants, using a Before-After, Matched Groups design, were significant at lower than a 5% level, which means minimal Type I error. However, the $Power = 0.6$ indicates higher than acceptable Type II error. A further concern is the small actual empathy change which, though statistically significant, may not be large enough for practical significance. Further studies are planned in Part 2. using larger numbers of participants, tighter testing protocol, and multiple levels of AVP workshops. Constructive inputs from all interested parties are welcome.

Background

The motivation for this study was the desire to identify some personal characteristic that is expected to be enhanced by participation in AVP workshops, and then find a way to measure that effect. The goals are to help us understand what makes the AVP program successful and to ultimately attract significant financial and institutional support for AVP. There are several human qualities that could be candidates for study. An obvious one is *anger*, and studies based on the STAXI analysis have been done recently. Another one is *community building*. Another one that is frequently noticed by AVP facilitators and participants is *empathy*. So far the evidence linking empathy changes to AVP participation, though convincing to AVP adherents, is anecdotal, mainly consisting of recollections of participants who seem to have been impacted. We understand that in order to be persuasive in the Human Relationships Community or Corrections Community beyond AVP, the evidence probably would need to be obtained by independent evaluators using established statistical methods of analysis. Full confidentiality of results would typically be assured by automated handling of the data, which would be coded to hide a participant's identity.

Such procedures may indeed be needed for full professional credibility of results, but I contend that valuable preliminary work can and should be done in-house by AVP itself using our convenient access to the data. This preliminary work can help answer questions like whether the AEI is appropriate for prison inmates enrolled in AVP, since there is always the possibility that any empathy noticed in workshop participants was already developed before they signed up for AVP, and the possibility that a significant number will not understand it. Possibly also, the AVP effect is measurable but too small to be of practical importance. This report is Part 1. in pilot study which begins such work. The results will hopefully indicate if the empathy effect using the AEI is large enough to pursue with an expensive, full scale,

professionally run and analyzed research project.

Some time ago, John Shuford and I were discussing *empathy* as an AVP-related quality, and he referred me to the AEI empathy measurement tool. The AEI questionnaire was developed, tested and validated at Arizona State University (Gerdes, Segal & Leitz), 2012. The background and the questionnaire are described and shown in Appendix I below. The authors proposed that there are five components of Empathy, such as self-other awareness, and emotion regulation, to name just two. Twenty-two statements, Q1 to Q22, cover these five components, and the responders select their response on a scale from “1” (for never) to “6” (for always), which covers the range between opposite extremes of response. This defines an *empathy* scale and enables a numerical evaluation.

The AEI has a built-in feature to test for self-consistency. Q2 is a reverse sense statement of Q10, and Q17 is a reverse sense statement of Q5. For example perfect consistency in responses would mean that if a Q5 response was “4”, then Q17 from the same individual should be “2”, which reverses to a “4”: If the response for Q10 was “1”, then their Q2 should be “6”, which reverses to “1”. The degree to which consistency is lacking could indicate careless or random responses. Treated statistically for many responders, this is useful in assessing the appropriateness of the test procedure and the attentiveness of the responders as they complete the questionnaire.

Procedure

The first step in conducting a pilot study using a questionnaire such as AEI is obtaining the required approvals. The AEI and proposed study were presented as a tool for evaluating AVP workshops on-the-average, such as we already have approval to do via our post-workshop evaluation questionnaires. It is not intended to critique or research individuals or the CA prison system. The project was approved by CSATF Warden Sherman in 2014 for my use at SATF.

I collected initial AEI data at SATF, and others have been collecting data elsewhere, to establish a testing protocol. The initial protocol was developed in conjunction with Pat Hardy but was refined somewhat as experience was gained. When all the workshop participants were first seated and ready, I gave them all the same instructions. They were assured that I was interested in the group average responses. Nobody's personal responses would become public or part of the workshop or affect their opportunity to qualify for future AVP workshops. To this end I asked them to code their questionnaire with their birth-date, not their name, each time they did the AEI questionnaire, so I could track personal response changes with each AVP workshop they did, identifying them by their code, not their name. Many people chose to mark their questionnaire with their name anyway. Judging by the fact that nobody questioned it, and seldom was there a blank questionnaire turned in, my assurance of confidentiality appeared to be trusted by those to whom it might matter and unimportant to most everyone else. The completed questionnaires were kept in my private custody.

This study involved inmates doing BASIC and ADVANCED AVP workshops in a California prison Level IV (highest level) yard, completing the AEI questionnaire just as they sat down to begin their BASIC and then repeating the questionnaire in either of two ways—just after they finished that BASIC, or two-to-four months later as they began their ADVANCED. Their response best represents their feelings or beliefs on each of twenty-two statements related to Empathy, Q1 to Q22. These who took both workshops constituted the test group, so

this is a *Before-BASIC-After*, Matched groups, design.

The analysis did not distinguish between the five components of empathy, but bunched all five empathy components together. There were fifteen test subjects in the *before-after* calculations and thirty-one subjects in the scoring/reverse scoring calculation which tests for validity. These comparatively small numbers resulted because earlier rounds of questionnaires were disregarded because of intentional or unintentional variations while the test protocol was being refined, and because the questionnaire itself was changed from twenty to twenty-two questions. The analysis is based on elementary statistics, as presented for instance, in Cohen (1) or Gravetter and Wallnau (2) or many other sources. Specifically this is a **repeated measurements *t* test**. It involved simple arithmetic, aided by a hand calculator which has a statistical package. Subsequent equation numbers refer to ref. 1.

Results

Several aspects of the results are of interest. The **proposed testing protocol needed to be refined before trustworthy data was obtained**. Trying various protocols, it became clear that the point in the workshop when the questionnaire is done appears to make a big difference. Doing the questionnaire at the beginning of a workshop took typically less than five minutes, and nearly everyone participated. When I used a two-sided questionnaire, often they neglected to complete the backside, so I stuck to the two-page, one-sided format. When it was done just before or after graduation, many of the responders were visibly anxious to finish up or get away to their next activity, and there were often indications that the questionnaire was filled out hurriedly or carelessly, such as skipped questions or entire blank pages. So I decided to get the *after* results at a later opportunity, just preceding an ADVANCED workshop two-to-four months later. An additional reason for the delay is to seek out lasting changes in empathy and avoid the effect of the transient elation of a just-completed workshop. Only these delayed *after* results were analyzed and are presented here.

A result from the raw data is the average AEI index before BASIC, which is “4.38”. Since “4” represents *Frequently*, and “5” represents *Almost Always*, the average responder apparently already considers himself to be already quite empathic before AVP.

Another result related to validity is the self-consistency of the results from each individual. The questionnaire was designed to enable consistency to be checked, in that two questions, Q5 and Q10, each have a reverse-sense counterparts, as described above, a Null hypothesis analysis shows that there was practically no difference, when averaged over thirty-three responders, between their responses and the translated reverse-sense responses. This suggests confidence in the attention, effort and comprehension of the participants.

The main result is the change in the AEI index *before* and *after* the BASIC workshop. For each responder, the empathy index value for each of the twenty-two statements before the BASIC workshop was subtracted from each value for after the BASIC. These twenty-two values were then averaged to give an averaged empathy change for that responder. These latter values were then averaged over the fifteen responders to give the average empathy change for the group participants, $diff=0.39$, with standard deviation $\sigma=0.53$.

The results can be interpreted with a **Null hypothesis analysis** to compute the **Type I error**, which relates the probability α of deciding there is a real empathy difference, when in fact there isn't. This result using eqn. (3-12) gave $t = \alpha = 2.8$, which translates (Table A-2) to 1.5% probability that the empathy difference can be attributed to chance and not to a real

difference. The usual criterion for acceptable Type I error is $< 5\%$. Our result would satisfy an even more rigorous criteria of 2% and **justifies rejecting the Null hypothesis and concluding that our measured empathy change is statistically significant.**

A further step is a **Power Analysis** to compute the **Type II error**. This is the probability *beta* of deciding that there is no significant empathy difference when in fact there is. The numerical complement of *beta*, $1.0 - \text{beta}$, is the **Power, which is the level of confidence that the result shows the real empathy effect to be significant.** This analysis yields (interpolating in Table A-5) **Power = 0.6**. By common convention, $\text{Power} > 0.8$ is accepted as criterion for deciding the observed empathy effect is significant. However, *Power* can be increased by having a larger number of responders, and in this situation it appears that increasing the number by a factor of three would bring the *Power* result into the desired range.

A very important practical aspect of any empathy gain is whether it is large enough to make any practical difference. Presumably, the responders are presumed to be able to distinguish between these adjacent steps in the empathy scale, understanding the difference between *Rarely* and *Sometimes*, or between *Frequently* and *Almost Always*, and so forth. Although the observed difference may be statistically significant, is an empathy gain of 0.39 of practical significance? Would it be observed in behavior? The distinguishable increment on the AEI scale might be assumed to be one-half the unit step size, or 0.5, meaning that any *empathy* difference smaller than this might be unnoticeable. Our *diff* result is comparable to this presumed distinguishability limit. This consideration can be taken into account in follow-up AEI work.

The results and concerns of the above work constitute Part 1. of this study. Thanks are extended to the helpful inputs from Dr. Laura Roberts, a Statistics Educator.

Outlook

A Part 2 phase is underway to extend the results and scope of the study and address the concerns of Part 1.

The tested population in Part 2 is changed and will come from a “mainline” yard at SATF. This is a Level IV prison yard comprised of the inmates with the most restricted movement and programming and who have not opted for reclassification to Protected Custody status in a Special Needs Yard (SNY). In contrast, Part 1. was from a protected custody Level IV yard, where inmates in general had more prior opportunity to do prison programming. A study (3) in another prison dealing with inmate behavior before and after AVP concluded that the inmates most likely to be strongly affected by AVP were those who had the least previous programming in prison. Thus, a “mainline” yard as in Part 2. may be the best situation for showing a large empathy effect.

An important change will be in the testing protocol. It is important to say that this information will benefit AVP and is not relayed to nor reported on in any way to prison administration. Additionally, experience showed that it is very important to make sure that the mood while the questionnaire is filled out is calm and unhurried. There has been the temptation to ask for the participants' cooperation “for a few moments to fill out a quick questionnaire” before the workshop itself begins. Experience now shows that this must be avoided, and it will be made clear that several minutes are available for thoughtful and unrushed responses to all twenty-two questions.

Another change for Part 2. will be increasing the size of the participant groups. The fifteen participants submitting questionnaires in Phase I for calculating p and $Power$ were the remnant remaining after ignoring results where the protocol was evolving or where the verbal instructions may not have been consistent. However, these data also were clearly not “normally distributed” in the statistical sense. Though there is no theoretical reason to assume that the mean empathy difference $diff$ will be different for a larger sample, the analysis tends toward greater accuracy overall when larger number of participants are involved because larger numbers are more likely to follow a “normal distribution”. The intention goal is to have fifty or more responders in Part 2. Other things being equal, the $Power$ resulting from this larger number of participants should exceed the target value of 0.8.

In Part 2 an expansion of the scope of the study is planned. If the empathy effect is significant or nearly significant for the BASIC-to-ADVANCED step, data taking will be extended to cover further stages in the AVP training sequence and capture BASIC+ADVANCED or the BASIC+ADVANCED+T4F effects of multiple workshops. Here, a marginally significant result may become significant, and this would impact concern about whether empathy changes are large enough to be of practical importance. The analysis in these cases could still employ a two-group, matched groups mode as in Part 1. Alternately, if a more conventional control group is desired, a two-group, independent groups mode could be used, though this would result in lower $Power$ values. Additionally, it may become worthwhile to expand the scope of the project by breaking out the data for the specific components of empathy (five in the AEI case) and analyze them separately for greater insight into an AVP effect. These goals should all be possible by operating with in-house resources as in Part 1.

With the progress expected in Part 2, coupled with the promising start of Part 1, it will hopefully become clear whether or not empathy enhancement is an important result of AVP workshops. The results could provide a solid basis for a full-scale study by an independent research agency, with the attendant costs and potential gains in AVP credibility and financial support. If not, it may point to research needs in other of the many human characteristic which anecdotal evidence has shown are so beneficially affected by participation in AVP workshops.

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4. Kenya Williams doctoral thesis at Solano state prison

Appendix I :

The Empathy Assessment Index (EAI)

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Background

The Empathy Assessment Index (EAI) was developed to update current measures of empathy to reflect recent neuroscience research, which documents that observable brain activity can be linked to specified components of empathy (Decety & Jackson, 2004). Four components of empathy have been identified: (a) affective response (automatic reactions based on one's observation of another), (b) self-other awareness (the ability to differentiate the experiences of another from one's own), (c) perspective-taking (the cognitive process of imagining the experiences of another), and (d) emotion regulation (the ability to sense another's feelings without becoming overwhelmed by the intensity of this experience) (Decety & Moriguchi, 2007). The development of these four components offers increased clarity for conceptualizing empathy (Gerdes, Segal, & Lietz, 2010) and provided the initial constructs for the measurement of interpersonal empathy.

The EAI is based on Gerdes & Segal's (2009) model, which incorporates emotional and cognitive components of empathy (Gerdes & Segal, 2011). The EAI was developed through a series of applications conducted to improve upon the psychometric properties of the EAI measure. In 2009, the first round used an exploratory factor analysis (EFA) on a 54-item preliminary version of the EAI (Gerdes, Lietz, & Segal, 2011). Although this initial version demonstrated some promise, the EFA identified some limitations of the initial measure, and several items needed to be changed or eliminated. In this original EFA study, the researchers included items from the Empathic Concern and Perspective-Taking components of the Interpersonal Reactivity Index (Davis, 1980; 1983). The items were used to demonstrate concurrent validity for the EAI's Affective Response and Perspective-Taking components. The results indicated statistically significant correlations between the EC and PT components of the IRI and the AR and PT components of the EAI. The other components of the IRI did not complement the cognitive neuroscience components of Self-Other Awareness and Emotion Regulation. Other standardized tests were used to validate those components (including the Cognitive Emotion Regulation Questionnaire (CERQ), (Garnefski & Kraaij, 2006) and items from the Mindfulness Attention and Awareness Scale (MAAS), (Brown & Ryan, 2003).

The objective of the next study was to build upon the previous research by improving chosen items and eliminating items that did not contribute significantly to the measure (Lietz, Gerdes, Sun, Geiger, Wagaman, & Segal, 2011). This round of development and testing of the EAI enhanced the reliability and validity of measuring empathy based on the four part social cognitive neuroscience definition of empathy. The result is a self-report Likert Scale instrument with 20 items representing the four components of (a) affective response, (b) self-other awareness, (c) perspective-taking, and (d) emotion regulation.

Attention to language and ease of understanding was given through reviews done with focus groups of students in research courses and at community GED classes. Social service providers were

also asked to review the wording of items with their clients in mind. These efforts helped to develop wording that was clear and understandable to all levels of the groups involved in testing the EAI.

The final stage of validation involved administering the EAI to groups thought to have lower levels of empathy (samples of participants involved in court mandated treatment programs for domestic violence or sex offenses) to see if there were statistical differences between their empathy scores and samples of professional social service providers. This known groups analysis was conducted to assess criterion validity. Based on a large body of research, we assumed that people involved in committing acts of domestic violence or sexual predation would have lower levels of empathy compared to professional social service providers. Analysis revealed that indeed the professionals scored statistically significantly higher than participants in the known groups, confirming the criterion validity of the EAI (Gerdes, Geiger, Lietz, Wagaman & Segal, 2012).

The findings from another round of data collection were used to assess how to better address the multiple components of empathy and address newly emerging neuroscience research (Walter, 2012; Decety, 2011). From this work, we further developed the EAI to ensure that some of the affective response components more accurately reflect the physiological reaction to an actual perceived event, as opposed to being impacted by the description of an event. The state of imagining or thinking about an experience and perceiving the other's experiences is actually "affective mentalizing" and is also neurologically observable (Schnell, Bluschke, Konradt & Walter, 2011).

Affective mentalizing is the process of cognitively appraising someone's emotional state (Frith & Frith, 2006). We infer other's emotional states through non-verbal cues (e.g., facial expressions) as well as knowledge about other people's situation and beliefs. When experiencing affective mentalizing, one may even have physiological reactions that mirror the imagined affect. Mentalizing can take place without much direct stimulus. For example, reading about a person's situation, or listening to someone talk about it on the phone, or someone else describing a person's situation can all evoke mental pictures of affective experiences. Therefore, to capture this aspect of empathy, we added a new component of affective mentalizing. In the fall of 2012 we administered the five component version of the EAI, and found it to be reliable and valid with a sample of 450 undergraduate college students.

Overall, the development and testing of the EAI spanned a four year period with eight different administrations to more than 3,500 participants.

Administration of the EAI

The 22 items of the EAI can be administered in a simple paper and pencil version or on-line through a survey instrument software program. The researchers have used both methods without problem. In order to diminish social desirability, the instrument has been titled a "Human Relations Survey" so that participants are not aware of the link to empathy. Also, when administering the EAI, all references to the components are dropped. We include those component references in brackets on this copy of the EAI so you can see the operationalization of the separate components.

The EAI has five components, for a total of 22 items. Two items, both under the Emotion Regulation component, are to be reverse-scored. The Likert Scale used ranges from 1 (never) to 6 (always) with choices 2-5 in between. The wording for the Likert Scale and the use of 6 choices were also established through focus groups and this format has been used as part of the reliability and validation testing. Therefore, the EAI should be used in its entirety as created by the authors. The typical amount of time to take the EAI is 5-10 minutes.

What do the Components Mean?

Definitions of empathy vary widely, and therefore it is difficult to develop meaningful interventions to develop and enhance empathic abilities. However, with the identification of the different components of empathy through neuroscience, we now have specific areas that can be focused on through interventions to improve overall empathy. The five components are: (a) affective response, (b) affective mentalizing, (c) self-other awareness, (d) perspective-taking, and (e) emotion regulation. What follows is a more detailed explanation of each component.

(a) **affective response** – the brain includes neurological pathways that are capable of physiologically simulating the experiences of others. Often referred to as “mirroring” in the literature, this ability is unconscious, automatic and involuntary. For example, if a person starts crying in front of you, even if you do not understand why, you too will feel like crying. Affective response can run through all types of emotions (happy, sad) as well as physical sensations (feeling pain when watching another person being physically hurt). Humans appear to be hard-wired to mimic one another, setting the stage for experientially connecting to another person.

(b) **affective mentalizing** – not all physiological reactions or mirroring come from the actual viewing of an event or experience. Often we are exposed to stories or explanations of events, and as we are hearing the information, our mind develops a picture of the events. This allows us to develop perceptions of another’s experiences. It may also trigger an affective or physiological response. When this occurs, we are “mentalizing” or imagining the event and potentially experiencing it as if it is happening to us as well.

(c) **self-other awareness** – once the affective response occurs, we need to recognize the difference between the experiences of another person from our own. We may feel like crying (as in the example above) but it is the other person’s experience and not our own. This moves empathic response into a cognitive or conscious arena.

(d) **perspective-taking** – assuming that one successfully mirrors and then processes the affective response to understand that it belongs to the other person, it becomes possible to cognitively process what it might be like to personally experience the experiences of another. This is what we commonly refer to as “stepping into the shoes of another.”

(e) **emotion regulation** – the last component helps us to move through these affective and cognitive processes without becoming overwhelmed or swept up into someone else’s emotions. This is the ability to sense another’s feelings without becoming overwhelmed by the intensity of the other person’s experience.

Although additional research is needed to understand how much of each component is necessary for the full effect of empathy, we do know that all five are needed to gain the full impact of empathy. By isolating these five components with the EAI, we can determine which areas might need more attention and improvement, and which in turn will raise the overall level of empathy.

For More Information

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General background on empathy and social work practice can be found in the *Journal of Social Service Research* (2011), 37 (3), 226-278 in five different articles.

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EMPATHY ASSESSMENT INDEX

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Please respond to the following questions by selecting the choice that most closely reflects your feelings or beliefs:

	Never	Rarely	Sometimes	Frequently	Almost always	Always
	1	2	3	4	5	6
1) When I see someone receive a gift that makes them happy, I feel happy myself. [AR]				1 2 3 4 5 6		
2) Emotional stability describes me well. [ER]					1 2 3 4 5 6	
3) I am good at understanding other people's emotions. [AM]					1 2 3 4 5 6	
4) I can consider my point of view and another person's point of view at the same time. [PT]					1 2 3 4 5 6	
5) When I get angry, I need a lot of time to get over it. [ER] R					1 2 3 4 5 6	
6) I can imagine what the character is feeling in a good movie. [PT]					1 2 3 4 5 6	
7) When I see someone being publicly embarrassed I cringe a little. [AR]					1 2 3 4 5 6	
8) I can tell the difference between someone else's feelings and my own. [SOA]					1 2 3 4 5 6	
9) When I see a person experiencing a strong emotion I can accurately assess what that person is feeling. [AM]					1 2 3 4 5 6	
10) Friends view me as a moody person. [ER] R					1 2 3 4 5 6	
11) When I see someone accidentally hit his or her thumb with a hammer, I feel a flash of pain myself. [AR]					1 2 3 4 5 6	

Please respond to the following questions by selecting the choice that most closely reflects your feelings or beliefs:

Never	Rarely	Sometimes	Frequently	Almost always	Always
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	1	2	3	4	5	6
12) When I see a person experiencing a strong emotion, I can describe what the person is feeling to someone else. [AM]	1	2	3	4	5	6
13) I can imagine what it's like to be in someone else's shoes. [PT]	1	2	3	4	5	6
14) I can tell the difference between my friend's feelings and my own. [SOA]	1	2	3	4	5	6
15) I consider other people's points of view in discussions. [PT]	1	2	3	4	5	6
16) When I am with someone who gets sad news, I feel sad for a moment too. [AR]	1	2	3	4	5	6
17) When I am upset or unhappy, I get over it quickly. [ER]	1	2	3	4	5	6
18) I can explain to others how I am feeling. [SOA]	1	2	3	4	5	6
19) I can agree to disagree with other people. [PT]	1	2	3	4	5	6
20) I am aware of what other people think of me. [SOA]	1	2	3	4	5	6
21) Hearing laughter makes me smile. [AR]	1	2	3	4	5	6
22) I am aware of other people's emotions. [AM]	1	2	3	4	5	6

Contains 5 components: Affective Response [AR], Affective Mentalizing [AM], Self-Other Awareness [SOA], Perspective-Taking [PT], and Emotion Regulation [ER]. AR = 5 items, AM = 4 items, SOA = 4 items, PT = 5 items, and ER = 4 items

Reverse scoring indicated by **R**